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REV. 5-93US DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

ATTORNEYS DOCKET NUMBER

P00,1794

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/ 674797

INTERNATIONAL APPLICATION NO.  
PCT/DE99/01370INTERNATIONAL FILING DATE  
06 MAY 1999PRIORITY DATE CLAIMED  
06 MAY 1998

## TITLE OF INVENTION

**METHOD FOR TRANSMITTING SERVICE DATA IN TELECOMMUNICATION SYSTEMS WITH WIRELESS  
TELECOMMUNICATION BASED ON A PREDEFINED RADIO INTERFACE PROTOCOL BETWEEN  
TELECOMMUNICATION DEVICES, ESPECIALLY VOICE DATA AND/OR PACKET DATA IN DECT SYSTEMS**

APPLICANT(S) FOR DO/EO/US

**MARTIN KORDSMEYER, ET AL.**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.  
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.  
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.  
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.  
5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)) - drawings attached.  
6. ☒ ☒ is transmitted herewith (required only if not transmitted by the International Bureau).  
7. ☐ has been transmitted by the International Bureau.  
8. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)  
9. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)) - drawings attached.  
10. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))  
11. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).  
12. ☐ have been transmitted by the International Bureau.  
13. ☐ have not been made; however, the time limit for making such amendments has NOT expired.  
14. ☒ have not been made and will not be made.  
15. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).  
16. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).  
17. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, Prior Art, Search Report).  
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.  
(SEE ATTACHED ENVELOPE)  
13. ☒ Amendment "A" Prior to Action.  
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.  
15. ☐ A substitute specification.  
16. ☒ A change of address letter attached to the Declaration.  
17. ☒ Other items or information:  
a. ☒ Request for Approval of Drawing Modifications, 2 sheets of drawings, Figures 1-2.  
b. ☒ Appointment of Associate Power of Attorney  
c. ☒ EXPRESS MAIL #EJ077704536US dated November 6, 2000.

U.S. APPLICATION NO. 09/674797

INTERNATIONAL APPLICATION NO.  
PCT/DE99/01370ATTORNEY'S DOCKET NUMBER  
P00,179417. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO ..... \$860.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) . . . \$690.00

No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but  
international search fee paid to USPTO (37 C.F.R. 1.445(a)(2)) ..... \$710.00Neither international preliminary examination fee (37 C.F.R. 1.482) nor international  
search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO ..... \$1000.00International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all  
claims satisfied provisions of PCT Article 33(2)-(4) ..... \$ 100.00**ENTER APPROPRIATE BASIC FEE AMOUNT =**

CALCULATIONS

PTO USE ONLY

\$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months  
from the earliest claimed priority date (37 C.F.R. 1.492(e)).

\$

Claims

Number Filed

Number  
Extra

Rate

Total Claims

06

- 20 =

0

X \$ 18.00

\$

Independent Claims

01

- 3 =

0

X \$ 80.00

\$

Multiple Dependent Claims

\$270.00 +

\$

**TOTAL OF ABOVE CALCULATIONS =**

\$ 860.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also  
be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)

\$

**SUBTOTAL =**

\$ 860.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months  
from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$ 860.00

Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property

+

**TOTAL FEES ENCLOSED =**

\$ 860.00

Amount to be  
refunded

\$

charged

\$

a. ☒ A check in the amount of \$ 860.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
overpayment to Deposit Account No. 501519. A duplicate copy of this sheet is enclosed.NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be  
filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SIGNATURE

SCHIFF HARDIN &amp; WAITE

PATENT DEPARTMENT

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233 South Wacker Drive

Chicago, Illinois 60606-6473

Mark Bergner

NAME

45,877

Registration Number

526 Rec'd PCT/PTO 06 NOV 2000

-1-

BOX PCT  
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE  
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE  
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

5	APPLICANT(S):	MARTIN KORDSMEYER ET AL
	ATTORNEY DOCKET NO.:	P00,1794
	INTERNATIONAL APPLICATION NO:	PCT/DE99/01370
	INTERNATIONAL FILING DATE:	06 MAY 1999
	INVENTION:	METHOD FOR TRANSMITTING SERVICE DATA IN TELECOMMUNICATION SYSTEMS WITH WIRELESS TELECOMMUNICATION BASED ON A PREDEFINED RADIO INTERFACE PROTOCOL BETWEEN TELECOMMUNICATION DEVICES, ESPECIALLY VOICE DATA AND/OR PACKET DATA IN DECT SYSTEMS

10 Assistant Commissioner for Patents,  
Washington D.C. 20231

## REQUEST FOR APPROVAL OF DRAWING MODIFICATIONS

Sir:

15 Enclosed are 2 sheets of drawings, Figures 1-2, showing in red, drawing changes to Figure 1. Approval of the changes is respectfully requested.

Submitted by.

Mark Bergner (Reg. No. 45,877)  
Mark Bergner

20 SCHIFF HARDIN & WAITE  
PATENT DEPARTMENT  
6600 Sears Tower  
Chicago, Illinois 60606-6473  
(312) 258-5779  
25 Attorney for Applicant(s)

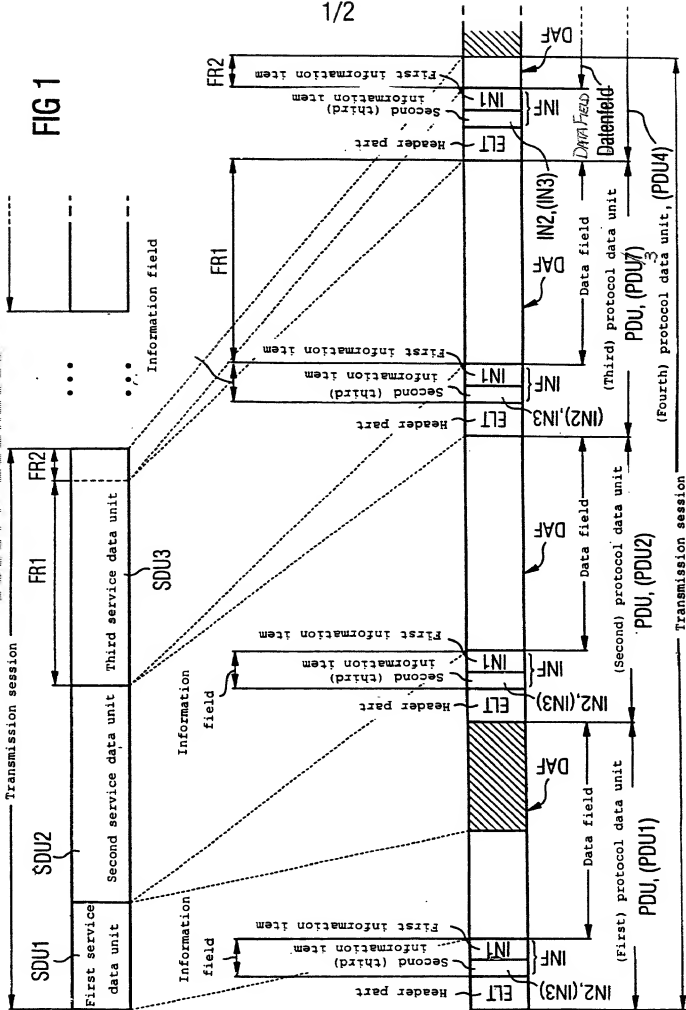
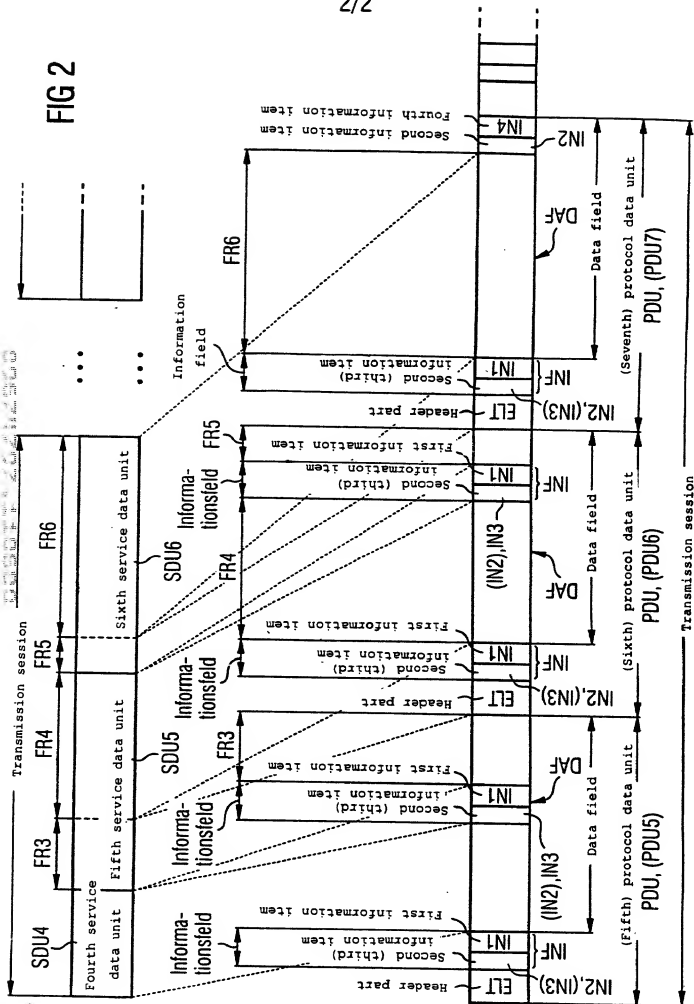


FIG 2



-1-

BOX PCT  
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE  
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE  
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

5	APPLICANT(S):	MARTIN KORDSMEYER ET AL
	ATTORNEY DOCKET NO.:	P00,1794
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	INVENTION:	METHOD FOR TRANSMITTING SERVICE DATA IN TELECOMMUNICATION SYSTEMS WITH WIRELESS TELECOMMUNICATION BASED ON A PREDEFINED RADIO INTERFACE PROTOCOL BETWEEN TELECOMMUNICATION DEVICES, ESPECIALLY VOICE DATA AND/OR PACKET DATA IN DECT SYSTEMS

10 Assistant Commissioner for Patents,  
Washington D.C. 20231

**AMENDMENT "A" PRIOR TO ACTION**

Sir:

Applicants herewith amend the above-referenced PCT application, and  
15 request entry of the Amendment prior to examination on the United States  
Examination Phase.

**IN THE SPECIFICATION:**

**On page 1:**

replace lines 1-5 with

20 --SPECIFICATION  
TITLE

25 METHOD FOR TRANSMITTING SERVICE DATA IN TELECOMMUNICATION  
SYSTEMS WITH WIRELESS TELECOMMUNICATION BASED ON A  
PREDEFINED RADIO INTERFACE PROTOCOL BETWEEN  
TELECOMMUNICATION DEVICES, ESPECIALLY VOICE DATA AND/OR  
PACKET DATA IN DECT SYSTEMS

## BACKGROUND OF THE INVENTION

### Field of the Invention

The invention relates to a method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems -;

5

above line 7, insert

--Description of the Related Art--;

in line 10, replace ", in which devices" with --. In these devices:--

in line 16, replace the last "the" with --a--;

10

in line 18, after "methods", insert --such as--; and

in line 20, after "e.g.", insert --,-.

### On page 2:

in lines 3-4, replace ", that is to say the same information," with --(i.e., the same information)--;

15

in line 6, after "transmitted", insert --;-;

in line 12, replace "..." with --through--;

in line 14, replace "," with --and--; and

in line 22, after "e.g.", insert --,-.

### On page 3:

20

in line 1, replace "source and data sink" with --sources and data sinks--;

in line 2, replace "and" with --These--; and cancel ",";

in line 3, cancel ", respectively,";

in line 4, before "scenario", insert --which is the--;

in line 5, after "data)", insert --and--; and

25

in line 6, after "e.g.", insert --,-.

On page 4, in line 4, replace "e.g." with --,- e.g.,-.

**On page 5:**

- in line 2, before "a service", insert –of–, and replace "e.g." with –, e.g.,–;  
in line 4, replace "SDU 3" with –SDU3–;  
in line 7, after "example", insert –,–, and after "as", insert –a–;  
5 in line 8, cancel ", respectively,";  
in line 9, cancel ", respectively,";  
in line 20, replace "..." with –through–; and  
in line 23, replace "..." with –through–.

**On page 6:**

- 10 in line 16, replace "So" with –The information field INF containing the  
information items IN1 through IN3 is provided after the header part ELT, so–;  
in lines 20-21, cancel ", respectively,";  
in line 22, cancel ", respectively,";  
in line 23, replace ", the information field" with –.–;  
15 cancel lines 24-25.

**On page 7,** in line 9, after "as", insert –an–; and replace "()" " with  
–parentheses–;

**On page 8:**

- 20 in line 7, replace "that is to say not decreased," with –i.e., not decreased.  
It is maintained–;  
in line 23, replace "So" with "The information field INF containing the  
information items IN1 through IN3 is provided after the header part ELT, so–;  
in line 24, after "(detect)", insert –: 1)–; and  
in line 25, after "is", insert –,–.



**On page 9:**

- in line 1, after "and", insert -2)-;
- in line 2, after "represent", insert -a)-;
- in lines 2-3, replace "or, respectively" with -b)-;
- 5 in line 4, replace "or" with -, c)-, and replace ", respectively," with -d)-;
- in line 5, replace ", the information" with -.-;
- cancel lines 6-7;
- in line 12, replace "1N2" with -1N2-;
- in line 16, after "as", insert -an-; and
- 10 in line 22, after "above", insert -is-.

**On page 10:**

- in line 11, replace "So" with -The information field INF containing the
- information items IN1 through IN3 is provided after the header part ELT, so-;
- in line 13, after "(detect)", insert -: 1)-;
- 15 in line 14, replace "and" with -, and 2)-;
- in line 14, after "represent", insert -a)-;
- in line 16, replace "or, respectively" with -b)-;
- in line 17, replace "or" with -, c)-;
- in line 18, replace ", respectively," with -d)-;
- 20 replace lines 19-21 with -data unit SDU3.-;
- in line 24, cancel "."; and
- in line 25, replace "1N3" with -1N3-.

**On page 11:**

- in line 4, replace "1N2" with -1N2-;
- 25 in line 5, replace "()" with -parentheses--;
- in line 19, after "SDU3", insert -.-;

in line 22, replace "()" with –parentheses–;

in line 24, replace "....." with –through–; and

in line 25, after "e.g.", insert –,.

**On page 12:**

5 in line 3, replace "fact, firstly," with –following facts. First,–; and

in line 9, replace "and that, secondly" with –. Second–.

**On substitute page 13:**

in line 12, replace "that is to say" with –i.e.,–;

in line 15, cancel "is";

10 in line 18, before "EP", insert –European Patent–, and cancel "A2"; and

in line 19, replace "wherein" with –where–.

**On substitute page 13a:**

above line 13, insert

–SUMMARY OF THE INVENTION–;

15 in line 13, cancel "forming the basis";

in line 18, replace "band width" with –bandwidth–; and

replace line 20 with

-- This object is achieved by a method for transmitting service data in  
telecommunication systems with wireless telecommunication based on a  
20 predefined radio interface protocol between telecommunication devices,  
comprising the steps of:

(a) transmitting the service data in protocol data units predefined by the  
radio interface protocol;

25 (b) transmitting a service data unit configured at least as a fragment in  
each protocol data unit independently of the size of the service data unit, which is  
configured at least as a fragment, in comparison with the size of a free part of the  
each protocol data unit which is in each case not yet occupied by service data;

(c) specifying, in each case, a service data length, which differs from the value "zero", of a respective the service data unit configured at least as a fragment, by a first information item allocated to the protocol data unit;

5 (d) specifying, in each case, an end of the respective service data unit by a second information item allocated to the protocol data unit;

(e) specifying, in each case, a non-end of the respective service data unit by a third information item allocated to the protocol data unit;

(f) specifying or allocating a fourth information item corresponding to the value "zero" of the service data length to the protocol data unit, together with  
10 the second information item in the protocol data unit when the transmission of service data is ended at least temporarily, especially within this protocol data unit. —.

**On page 14:**

in line 1, replace "consists in" with —comprises—, and cancel "30";  
15 in lines 15-16, cancel ", respectively,";  
in line 18, replace "(this method)" with —/method—;  
in line 19, cancel ", respectively,";  
in line 20, replace "band width" with —bandwidth—;  
in line 21, replace "e.g." with —, e.g.,—; and  
20 in line 24, after "one", insert —absent the inventive method—.

**On page 15:**

replace lines 1-2 with  
— Advantageous further developments of the invention include a method  
that further transmits service data in a protected manner. A step may be provided  
25 of arranging the first information item, the second information item and the third  
information item in front of the service data unit, which is at least configured as a  
fragment, in the respective protocol data unit. Finally, the second information  
item may consist of the value "0" of a bit and the third information item may  
consist of the value "1" of the bit. The data in the telecommunication systems

may be voice or packet data in DECT systems.--

above line 3, insert

--BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a data structure timing diagram showing a basic service data  
5 transmission scenario; and

Figure 2 is a data structure timing diagram showing a service data  
transmission scenario according to the invention.--;

above line 5, insert

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--;

10 in line 5, replace "means" with --way--;  
replace line 6 with --not-to-scale representation, a service data--;  
in line 8, replace ", for example" with --( for example,--;  
in line 10, cancel "30", and cancel ", ";  
in line 11, cancel "respectively, ", and replace ", e.g." with --) e.g.,--;  
15 in line 20, after "different", insert --alternatives--, and after "which",  
insert --,--;  
in line 21, replace "... " with --through--; and  
in line 25, replace "... " with --through--.

**On page 16:**

20 in line 1, cancel "so-called";  
in line 3, replace "... " with --through--;  
in line 5, before "bit", insert --a--;  
in line 7, replace "1N2" with --IN2--;  
in line 8, replace "1N3" with --IN3--;  
25 in line 23, replace "So" with --The information field INF containing the  
information items IN1 through IN3 is provided after the header part ELT, so--; and  
in line 24, after "(detect)", insert --: 1).

**On page 17:**

in line 1, replace "is and" with –is, and 2)–;

in line 2, after "represent", insert –a)–;

in line 3, replace the first "or" with –, b)–, and replace the last "or" with

5        –, c)–;

in line 4, replace "respectively," with –d)–;

in line 5, replace "SDU4, the information field INF" with –SDU4.–;

cancel lines 6-7;

in line 12, replace "IN2" with –IN2–;

10        in line 16, after "as", insert –an–, and replace " "()" " with –parentheses–;

and

in line 18, cancel "20".

**On page 18:**

in line 2, replace "..." with –through–;

15        in line 8, after "represent", insert –: a)–;

in line 9, replace "or, respectively," with –, b)–;

in line 10, replace "or" with –, c)–; and

in line 11, replace "respectively," with –d)–.

**On page 19:**

20        in line 3, replace "IN3" with –IN3–;

in line 7, replace "IN2" with –IN2–;

in line 8, replace " "()" " with –parentheses–;

in line 24, replace "So" with --The information field INF containing the  
information items IN1 through IN3 is provided after the header part ELT, so–; and

25        in line 25, after "(detect)", insert –: 1)–.

**On page 20:**

in line 2, replace "and" with –, and 2)–;

in line 3, after "represent", insert -a)-;  
in line 4, replace "or, respectively," with -, b)-;  
in line 5, replace the first "or" with -, c)-;  
in lines 5-6, replace ", respectively," with -d)-;  
in line 6, replace the last ", the" with -.-;  
cancel lines 7-8;  
in line 15, replace "IN2" with -IN2-; and  
in line 20, replace "()" with -parentheses-.

**On page 21:**

in line 6, replace "...IN3" with -- through IN3-;  
in line 12, after "represent", insert -a)-;  
in line 13, replace "or, respectively," with -, b)-;  
in line 14, replace "or" with -, c)-; and  
in line 15, replace "respectively," with -d)-.

**On page 22:**

in line 7, replace "IN3" with -IN3-;  
in line 11, replace "IN2" with -IN2-; and  
in line 13, replace "()" with -parentheses-.

**On page 23:**

in line 6, replace "So" with --The information field INF containing the  
information items IN1 through IN3 is preferably provided after the header part  
ELT, so-;

in line 7, after "(detect)", insert -: 1)-;  
in line 9, replace "and" with -, and 2)-;  
in line 10, after "represent", insert -a)-;  
in line 11, replace "or, respectively," with -, b)-;  
in line 12, replace "or" with -, c)-;

in line 13, replace "respectively," with -d)-;  
replace lines 14-15 with -SDU6.-; and  
in line 22, replace "1N2" with -1N2-.

**On page 24:**

- 5 in line 1, after "as", insert --an-;  
in line 2, replace "()" with --parentheses-;  
in line 3, cancel "10";  
in line 4, replace "..." with --through-;  
in line 5, after "e.g.", insert --,--;
- 10 in line 14, replace "1N2" with -1N2-, and replace "1N4" with -1N4-;  
in line 15, replace "1N4" with -1N4-;  
in lines 17-18, replace "or, respectively," with --/--; and  
below line 21, insert
- The above-described method are illustrative of the principles of the
- 15 present invention. Numerous modifications and adaptations thereof will be readily  
apparent to those skilled in this art without departing from the spirit and scope of  
the present invention.--.

**IN THE CLAIMS:**

**On page 25 :**

- 20 replace line 1 with --WHAT IS CLAIMED IS:--;  
Please amend claims 1-4 as follows:
1. (Amended) A method for transmitting service data in  
telecommunication systems with wireless telecommunication based on a  
predefined radio interface protocol between telecommunication devices,  
25 comprising the steps of [especially voice data and/or packet data in DECT  
systems, having the following features]:
- [(a) the] transmitting said service data [are transmitted] in protocol data  
units [(PDU5...PDU7)] predefined by said [the] radio interface protocol; [;

[(b) at least one] transmitting a service data unit [(SDU4...SDU6)] configured at least as a fragment [(FR3...FR6) is transmitted] in each protocol data unit [(PDU5...PDU7)] independently of the size of said [the] service data unit [(SDU4...SDU6)], which is configured at least as a fragment, in comparison with the size of a [the] free part of said each [the] protocol data unit [(PDU5...PDU7)] which is in each case not yet occupied by service data; [,]

[(c)] specifying, in each case, a service data length, which differs from the value “zero”, of a [the] respective said service data unit [(SDU4...SDU6)] configured at least as a fragment, [(FR3...FR6) is in each case specified] by a first information item [(IN1)] allocated to said [the] protocol data unit; [(PDU5...PDU7),]

[(d) the] specifying, in each case, an end of said [the] respective service data unit [(SDU4...SDU6) is in each case specified] by a second information item [(IN2)] allocated to said [the] protocol data unit; [(PDU5...PDU7),]

[(e) the] specifying, in each case, a non-end of said [the] respective service data unit [(SDU4...SDU6) is in each case specified] by a third information item [(IN3)] allocated to said [the] protocol data unit; [(PDU5...PDU7),]

[(f)] specifying or allocating a fourth information item [(IN4)] corresponding to the value “zero” of the service data length [is specified or, respectively, allocated] to said [the] protocol data unit [(PDU5...PDU7)], together with said [the] second information item [(IN2)] in said [the] protocol data unit [(PDU5...PDU7)] when said [the] transmission of service data is ended at least temporarily [, especially within this protocol data unit].

2. (Amended) The method as claimed in claim 1, further comprising the step of transmitting in a protected manner said [characterized in that the] service data [are transmitted protected].



3. (Amended) The method as claimed in claim 1, further comprising the step of: [or 2, characterized in that]

arranging said [the] first information item [(IN1)], said [the] second information item [(IN2)] and said [the] third information item [(IN3)] are arranged in front of said [the] service data unit [SDU4...SDU6], which is at least configured as a fragment, in said [the] respective protocol data unit [(PDU5...PDU7)].

4. (Amended) The method as claimed in claim 1, wherein said [one of claims 1 to 3, characterized in that the] second information item [(IN2)] consists of the value "0" of a bit and said [the] third information item [(IN3)] consists of the value "1" of the bit.

Please add the following claims 5 and 6.

5. The method as claimed in claim 1, wherein said data in telecommunication systems is voice or packet data in DECT systems.

6. The method as claimed in claim 1, wherein said service data is ended at least temporarily within said protocol data unit.

**IN THE ABSTRACT:**

**On page 27:**

cancel lines 2-5;

in line 11, replace "band width" with –bandwidth–;

in line 13, cancel "in the form of";

in line 16, replace ", " with –(–;

in line 17, replace ", " with –)–;

in line 18, cancel ", respectively,";


in line 22, replace ", or, respectively," with –or–; and  
cancel line 25.

**REMARKS**

The present Amendment revises the specification and claims to conform to United States patent practice, before examination of the present PCT application in the United States National Examination Phase. All of the changes are editorial and applicant believes no new matter is added thereby. The amendment of claims 1-4 and the addition of claims 5 and 6 is not intended to be a surrender of any of the subject matter of those claims.

Early examination on the merits is respectfully requested.

Submitted by,

 (Reg. No. 45,877)  
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Attorneys for Applicant

21PR19

09/ 674797  
526 Rec'd PCT/PTO 06 NOV 2000

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Description

**Method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems**

In communication systems comprising a message transmission link between a message source and a message sink, transmitting and receiving devices are used for message processing and transmission, in which devices

- 1) the message processing and message transmission can take place in a preferred direction of transmission (simplex operation) or in both directions of transmission (duplex operation),
- 2) the message processing is analog or digital,
- 3) the message transmission takes place via the long-distance link wirelessly on the basis of various message transmission methods FDMA (Frequency Division Multiple Access), TDMA (Time Division Multiple Access) and/or CDMA (Code Division Multiple Access) - e.g. in accordance with radio standards such as DECT, GSM, WACS or PACS, IS-54, IS-95, PHS, PDC etc. [cf. IEEE Communications Magazine, January 1995, pages 50 to 57; D.D. Falconer et al: "Time Division Multiple Access Methods for Wireless Personal Communications"] and/or on wires.

"Message" is a generic term which stands both for the meaning (information) and for the physical representation (signal). In spite of the same meaning of a message, that is to say the same information, different signal forms can occur. Thus, for example, a message relating to an object can be transmitted

- (1) in the form of an image,
- (2) as a spoken word,
- (3) as a written word,
- (4) as an encrypted word or image.

In this context, the type of transmission according to (1) ... (3) is normally characterized by continuous (analog) signals whereas in the type of transmission according to (4), discontinuous signals (e.g. pulses, digital signals) are usually produced.

On the basis of this general definition of a communication system, the invention relates to a method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems.

The wireless transmission of service data - e.g. the transmitting and receiving of, for example, voice data and/or packet data over the radio path over relatively large distances - between telecommunication devices, which are spatially separate

from one another, are constructed as data source and data sink and can be connected by wireless telecommunication, of a telecommunication system or, respectively, a telecommunication network (scenario for the long-distance transmission of service data) can take place with the aid of DECT (digital enhanced cordless telecommunication) technology, e.g. according to the publication "Vortrag von A. Elberse, M. Barry, G. Fleming zum Thema: (lecture by A. Elberse, M. Barry, G. Fleming on the subject): "DECT Data Services - DECT in Fixed and Mobile Networks", June 17/18, 1996, Hotel Sofitel, Paris; pages 1 to 12 and summary" in conjunction with the printed documents (1) "Nachrichtentechnik Elektronik 42 (1992) Jan/Feb No. 1, Berlin, DE; U. Pilger "Struktur des DECT-Standards" (structure of the DECT standard), pages 23 to 29; (2) ETSI publication ETS 300175-1...9, October 1992; (3) Components 31 (1993), Vol. 6, pages 215 to 218; S. Althamrner, D. Brückmann: "Hochoptimierte IC's für DECT-Schnurlostelefone" (highly optimized ICs for DECT cordless telephones); (4) WO 96/38991 (cf. Figures 5 and 6 and the respective associated description); (5) Training sheets - Deutsche Telecom, Vol. 48, 2/1995, pages 102 to 111; (6): WO 93/21719 (Figure 1 to 3 and the associated description).

The DECT standard describes a radio access technology for wireless telecommunication in the frequency band from 1880 MHz to 1900 MHz with GFSK (Gaussian frequency shift keying) modulation and a Gaussian filter characteristic of  $BT = 0.5$ . The

DECT technology enables any telecommunication network to be accessed. In addition, the DECT technology supports a multiplicity of different applications and services. The DECT applications comprise e.g. telecommunication in the home (residential cordless telecommunication), accesses to the public PSTN, ISDN, GSM and/or LAN network, the WLL (wireless local loop) scenario and the CTM (cordless terminal mobility) scenario. The telecommunication services supported are e.g. voice, fax, modem, E-mail, Internet, X.25 services etc.

The DECT standard provides various methods for transmitting service data, especially the protected transmission of voice data and/or packet data (cf. ETSI publication ETS 300175-4, September 1996, chapter 12). It is necessary to divide the service data to be transmitted into data units or data packets which are suitable for transmission (protocol data unit PDU). The protocol data units are adapted to the DECT radio interface protocol, especially to the DECT-related TDMA structure and to the various types of transmission for transmitting service data (cf. ETSI publication ETS 300175-4, September 1996, chapter 12, especially tables 21 to 26). For dividing the service data into the protocol data units, the DECT standard also contains a segmenting mechanism or segmenting procedure, respectively, which allows only a single service data unit (SDU) or possibly only a single fragment of a service data unit to be transmittable in each protocol data unit.

Figure 1 shows in a basic representation, not true to scale, a service data transmission scenario in which e.g. three service data units, a first service data unit SDU1, a second service data unit SDU2 and a third service data unit SDU 3 are transmitted in accordance with the DECT radio interface protocol in a transmission session for transmitting service data in a DECT system, for example between a DECT base station used as transmitter or, respectively, receiver and a DECT mobile part used as receiver or, respectively, transmitter.

For this transmission session, a predetermined number of protocol data units PDU, a first protocol data unit PDU1, a second protocol data unit PDU2, a third protocol data unit PDU3 and a fourth protocol data unit PDU4, which are adapted to the DECT radio interface protocol, especially to the DECT-related TDMA structure and to the various types of transmission for the service data transmission, are available which in each case essentially have a predefined basic structure and which are transmitted successively according to the DECT radio interface protocol. The basic structure of the protocol data unit header PDU1 ...PDU4 in each case consists of an introductory part ELT, the so-called PDU header, and information field INF and a data field DAF which are arranged in the specified order in the protocol data units PDU1 ...PDU4.

The information field INF contains a first information item IN1 and an extension configured as bit. The extension consists

of a second information item 1N2 representing the value "0" of the bit or of a third information item 1N3 representing the value "1" of the bit. In the text which follows, it will be explained what meaning the individual information items have.

In the specified transmission session, the first service data unit SDU1 is transmitted in the first protocol data unit PDU1, the second service data unit SDU2 is transmitted in the second protocol data unit PDU2 and the third service data unit SDU3 is transmitted in the third protocol data unit PDU3 and the fourth protocol data unit PDU4.

#### First protocol data unit PDU1

The first service data unit SDU1 is packed into the data field DAF of the first protocol data unit PDU1 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the first protocol data unit PDU1 is and whether the service data contained in the data field DAF represent a fragment of the first service data unit SDU1 or, respectively, the non-end of the first service data unit SDU1 or the complete first service data unit SDU1 or, respectively, the end of the first service data unit SDU1, the information field INF containing the information items INI. . . 1N3 is provided after the header part ELT.



In the present case, the first information item IN1 specifies the length of the first service data unit SDU1 because the first service data unit SDU1 is smaller than the data field DAF of the first protocol data unit PDU1, whereas the second  
5 information item IN2 specifies that the service data contained in the data field DAF represent the complete first service data unit SDU1 and that the end of the first service data unit SDU1 is present. The third information item IN3, which, in principle, is also possible as extension, is shown in "()" in the present case in Figure 1.

Since the first service data unit SDU1 is smaller than the data field DAF of the first protocol data unit PDU1 and, for the transmission of service data, the condition holds that only one service data unit SDU at least configured as a fragment can be transmitted in each protocol data unit PDU, the shaded area of the data field DAF in Figure 1 remains unused for the transmission of service data. Ultimately, this has the result that the radio channel capacity available in accordance with the DECT standard is not optimally utilized. In other words, the  
20 bandwidth available in the DECT system for the telecommunication is poorly utilized.

In addition, this also results in a deterioration in the transmission rate in the transmission of service data.

This type of service data transmission also leads to the  
25 result that, when a service data unit is lost due to transmission

disturbances on the radio link between the DECT base station and the DECT mobile part, the resultant greater transmission period cannot be made up or compensated for in the service data transmission (occurrence of lost time). This means that the quantity of service data to be transmitted in the telecommunication device (DECT base station and/or DECT mobile part) is maintained, that is to say not decreased, even though the quality of transmission of the transmission link between the telecommunication devices may only be temporarily poor, and that after another disturbance of the transmission link, an intervention into the data transfer is necessary because the quantity of service data becomes greater and greater.

So that this disadvantageous unwanted phenomenon will not occur in the first place, it is possible, according to the DECT standard, to provide a fixed spare capacity in the protocol data unit for transmitting service data which can be used in the case of transmission losses.

#### Second protocol data unit PDU2

The second service data unit SDU2 is packed into the data field DAF of the second protocol data unit PDU2 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the second protocol data unit PDU2 is

and whether the service data contained in the data field DAF represent a fragment of the second service data unit SDU2 or, respectively, the non-end of the second service data unit SDU2 or the complete second service data unit SDU2 or, respectively, the end of the second service data unit SDU2, the information field INF containing the information items IN1...IN3 is provided after the header part ELT.

In the present case, the first information item IN1 specifies the service data length of the second service data unit SDU2 because the second service data unit SDU2 is exactly as large as the data field DAF of the second protocol data unit PDU2, whereas the second information item IN2 specifies that the service data contained in the data field DAF represent the complete second service data unit SDU2 and that the end of the second service data unit SDU2 is present. The third information item IN3, which, in principle, is also possible as extension, is represented in "0" in Figure 1 in the present case.

Since the second service data unit SDU2 is exactly as large as the data field DAF of the second protocol data unit PDU2, the data field DAF of the second protocol data unit PDU2 is completely utilized for the transmission of service data in the present case. The phenomenon described above in conjunction with the transmission of the first service data unit

SDU1 will therefore not occur in the present case.

Third protocol data unit PDU3 and fourth protocol data unit PDU4

The third service data unit SDU2 is packed into the data field DAF of the third protocol data unit PDU3 and the fourth protocol data unit PDU4 by the transmitting telecommunication device (transmitter) of the DECT system because the third service data unit SDU3 is larger than the data field DAF of the third protocol data unit PDU3. The third protocol data unit PDU3 is therefore completely filled with a corresponding first fragment FR1 of the third service data unit SDU3, whereas the remainder of the third service data unit SDU3, a second fragment FR2, is packed into the fourth protocol data unit PDU4. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the third protocol data unit PDU3 is and whether the service data contained in the data field DAF represent a fragment of the third service data unit SDU3 or, respectively, the non-end of the third service data unit SDU3 or the complete third service data unit SDU3 or, respectively, the end of the third service data unit SDU3, the information field INF containing the information items IN1...IN3 is provided after the header part ELT.

In the present case, the first information item IN1 in the third protocol data unit PDU3 specifies the service data length of the first fragment. FR1 of the third service data unit SDU2, whereas the third information item IN3 specifies that the service

data contained in the data field DAF represent the first fragment FR1 of the third service data unit SDU3 and that the non-end of the third service data unit SDU3 is present. The second information item LN2, which, in principle, is also possible as extension, is shown in "()" in Figure 1 in the present case.

Since the first fragment FR1 of the third service data unit SDU3 is exactly as large as the data field DAF of the third protocol data unit PDU3, the data field DAF of the third protocol data unit PDU3 is completely utilized for the transmission of service data in the present case. The phenomenon described above in conjunction with the transmission of the first service data unit SDU1 will therefore not occur in the present case.

In the fourth protocol data unit PDU4, the first information item IN1 specifies the service data length of the second fragment FR2 of the third service data unit SDU3, whereas the second information item IN2 specifies that the service data contained in the data field DAF represent the second fragment FR2 of the third service data unit SDU3, that the second fragment FR2 represents the remainder of the third service data unit SDU3 and that the end of the third service data unit SDU3 is present. The third information item IN3 which, in principle, is also possible as extension, is shown in "()" in Figure 1 in the present case.

The transmission session is ended at least temporarily with the transmission of the service data units SDU1..... SDU3. This means, e.g. for the downlink, that the DECT base station has no

more service data to be transmitted by it to the DECT mobile part at the moment. The DECT mobile part is automatically informed of this non-transmission state (default state) by the fact, firstly, according to the predetermined transmission protocol mentioned above - which says that in each protocol data unit, only a single service data unit (SDU) or possibly only a single fragment of a service data unit can be transmitted - only the second fragment FR2 of the third service data unit SDU3 is transmitted in the fourth protocol data unit SDU4 and that, secondly, no further protocol data unit containing service data is sent to the DECT mobile part by the DECT base station. The above statements for the downlink can also be transferred to the case where the transmission session occurs on the uplink.

Since the second fragment FR2 of the third service data unit SDU3 is smaller than the data field DAF of the fourth protocol data unit PDU4 and, for the transmission of service data, the condition holds that only one service data unit SDU configured at least as a fragment can be transmitted in each protocol data unit PDU, the shaded area of the data field DAF in Figure 1 remains unused for the transmission of service data. Ultimately, this has the result that the radio channel capacity available in accordance with the DECT standard is not optimally utilized. In other words, the band width available in the DECT system for telecommunication is poorly utilized.

In addition, this also results in a deterioration in the transmission rate in the transmission of service data.

5 This type of service data transmission also leads to the result that, when a service data unit is lost due to transmission disturbances on the radio link between the DECT base station and the DECT mobile part, the resultant greater transmission period cannot be made up or compensated for in the service data transmission (occurrence of lost time). This means that the quantity of service data to be transmitted in the telecommunication device (DECT base station and/or DECT mobile part) is maintained, that is to say not decreased, even though the quality of transmission of the transmission link between the telecommunication devices may only be temporarily poor, and that  
10  
15 after another disturbance of the transmission link, an is intervention into the data transfer is necessary because the quantity of service data becomes greater and greater.

EP 0 708 576 A2 discloses a method for the transmission of payload data in telecommunication systems wherein the concern is  
20 how payload data blocks fashioned as CDMA data packets can be transmitted in ATM cells fashioned as data units. A distinction is made between a multiplex mode and a non-multiplex mode for this transmission. In the non-multiplex mode, a first control octet is contained in the information field of an ATM cell,  
25 whereas the first control octet and a second control octet are

5 contained in the information field of the ATM cell in the multiplex mode. The first control octet contains an ACO field with one bit length and a PL field with six bit lengths and a parity field with one bit length. The ACO field indicates whether the first control octet is immediately followed by the second control octet or not. Regardless of whether the first control octet is followed by a second control octet, the PL field indicates the packet length of the CDMA data packet that immediately follows the control octet or the control octets. The parity field serves for error recognition.

10 The object forming the basis of the invention consists in transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, with enhanced utilization of the band width of the telecommunication system and at a greater transmission rate.

15 20 This object is achieved by the features of patent claim 1.



The basic concept of the invention consists in 30 transporting service data units to be transmitted, in the transmission of service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, cascaded (in the form of a cascade arrangement) by radio in protocol data units adapted to the radio interface protocol. The protocol data units in each case contain the same number of information fields, configured especially as length indicators for specifying the respective length of the service data, as there are service data units or, respectively, fragments of service data units contained in the respective protocol data unit. In addition, each information field contains an extension (a reference) in the form of a concatenated list whether further service data units or, respectively, further fragments of service data units follow in the respective protocol data unit.

This procedure (this method) enables the transmission capacity in the telecommunication system or, respectively, the band width of the telecommunication system to be optimally utilized and time delays in the transmission of service data e.g. due to transmission disturbances or short-time overloading to be compensated with a higher data transmission rate than the possible one.

Advantageous further developments of the invention are specified in the subclaims.

An illustrative embodiment of the invention will be explained with reference to Figure 2.

5       Based on Figure 1, Figure 2 shows, by means of a basic representation which is also not true to scale, a service data transmission scenario in which, in a transmission session for transmitting service data in a DECT system, for example between a DECT base station used as transmitter and, respectively, receiver and a 30 DECT mobile part used as receiver and, respectively, transmitter, e.g. three service data units, a fourth data service unit SDU4, a fifth service data unit SDU5 and a sixth service data unit SDU6 are transmitted in accordance with the DECT radio interface protocol.

10       For this transmission session, a predetermined number of protocol data units PDU, a fifth protocol data unit PDU5, a sixth protocol data unit PDU6 and a seventh protocol data unit PDU7, which are adapted to the DECT radio interface protocol, especially to the DECT-oriented TDMA structure and to the  
15       different are available, which like the protocol data units PDU1... PDU4 in Figure 1, in each case essentially have a predetermined basic structure and which are transmitted successively in accordance with the DECT radio interface protocol. The basic structure of the protocol data units  
20       PDU5...PDU7 in each case again consists of the header part ELT,  
25

the so-called PDU header, the information field INF and the data field DAF which are arranged in the specified order in the protocol data units PDU5...PDU7.

The information field INF again contains the first information item IN1 and the extension configured as bit. The extension again consists either of the second information item IN2 representing the value "0" of the bit or of the third information item IN3 representing the value "1" of the bit. The meaning of the individual information items is identical with the meaning of the information items in Figure 1.

In the specified transmission session, the fourth service data unit SDU4 is transmitted in the fifth protocol data unit PDU5, the fifth service data unit SDU5 is transmitted in the fifth protocol data unit PDU5 and the sixth protocol data unit PDU6, and the sixth service data unit SDU6 is transmitted in the sixth protocol data unit PDU6 and the seventh protocol data unit PDU7.

#### Fifth protocol data unit PDU5

The fourth service data unit SDU4 is packed into the data field DAF of the fifth protocol data unit PDU5 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the service data length of the service data in the data field DAF of the fifth protocol data

unit PDU5 is and whether the service data contained in the data field DAF represent a fragment of the fourth service data unit SDU4 or the non-end of the fourth service data unit SDU4 or the complete fourth service data unit SDU4 or, respectively, the end of the fourth service data unit SDU4, the information field INF containing the information items IN1...IN3 is preferably provided after the header part ELT.

In the present case, the first information item IN1 specifies the length of the fourth service data unit SDU4 because the fourth service data unit SDU4 is smaller than the data field DAF of the fifth protocol data unit PDU5, whereas the second information item IN2 specifies that the service data contained in the data field DAF represent the complete fourth service data unit SDU4 and that the end of the fourth service data unit SDU4 is present. The third information item IN3, which, in principle, is also possible as extension, is shown in "()" in Figure 2 in the present case, as in Figure 1.

Since the fourth service data unit SDU4 is 20 smaller than the data field DAF of the fifth protocol data unit PDU5, a data segment - the shaded area as in Figure 1 - of the data field DAF is not needed for the transmission of the fourth service data unit SDU4. In distinction from Figure 1, this segment is filled essentially with service data of the fifth service data unit SDU5 by the transmitting telecommunication device (transmitter) of the DECT system if service data are still to be transmitted. The

restriction to "essentially" must be made because the information field INF with the information items IN1...1N3 is again needed with the transmission of service data of the fifth service data unit SDU5 in the fifth protocol data unit PDU5.

5       The information field is required so that the receiving telecommunication device (receiver) can evaluate (detect) whether the service data contained in the free data segment of the data field DAF in the fifth protocol data unit PDU5 represent a fragment of the fifth service data unit SDU5 or, respectively, the non-end of the fifth service data unit SDU5 or the complete fifth service data unit SDU5 or, respectively, the end of the fifth service data unit SDU5 and how large the service data length of the service data is in the free data segment of the data field DAF in the fifth protocol data unit PDU5.

10       The information field INF is preferably located following the fourth service data unit SDU4 and preceding the service data of the fifth service data unit SDU5 in the fifth protocol data unit PDU5.

15       Since the fifth service data unit SDU5 is larger than the  
20       free data segment of the data field DAF in the fifth protocol data unit PDU5, the fifth protocol data unit PDU5 is preferably completely filled with a corresponding third fragment FR3 of the fifth service data unit SDU5. In the information field INF following the fourth service data unit SDU4 in the fifth protocol  
25       data unit PDU5, the first information item IN1 in the fifth

protocol data unit PDU5 specifies the service data length of the third fragment FR3 of the fifth service data unit SDU5, whereas the third information item LN3 specifies that the service data contained in the data segment of the data field DAF represent the third fragment FR3 of the fifth service data unit SDU5 and that the non-end of the fifth service data unit SDU5 is present. The second information item LN2, which, in principle, is also possible as extension, is represented in "()" in Figure 2 in the present case, as in Figure 1.

Since the third fragment FR3 of the fifth service data unit SDU5 is preferably just as large as the (free) data segment of the data field DAF in the fifth protocol data unit PDU5, the data field DAF of the fifth protocol data unit PDU5 is completely utilized for transmitting the service data in the present case. The phenomenon described in conjunction with the transmission of the first service data unit SDU1 in Figure 1 will not, therefore, occur in the present case.

#### Sixth protocol data unit PDU6

The service data of the fifth service data unit SDU5, which did not fit into the fifth protocol data unit PDU5, are packed into the data field DAF of the sixth protocol data unit PDU6 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the

service data is in the data field DAF of the sixth protocol data unit PDU5 and whether the service data contained in the data field DAF represent a fragment of the fifth service data unit SDU5 or, respectively, the non-end of the fifth service data unit SDU5 or the complete fifth service data unit SDU5 or, respectively, the end of the fifth service data unit SDU5, the information field INF containing the information items IN1... IN3 is preferably provided following the header part ELT.

In the present case, the first information item IN1 specifies the service data length of the fourth fragment FR4 because a fourth fragment FR4 of the fifth service data unit SDU5 - which contains the service data of the fifth service data unit SDU5 which did not fit into the fifth protocol data unit PDU5 - is smaller than the data field DAF of the sixth protocol data unit PDU6, whereas the second information item IN2 specifies that the service data contained in the data field DAF now represent the complete fifth service data unit SDU5 and that the end of the fifth service data unit SDU5 is present. The third information item IN3, which, in principle, is also possible as extension, is shown in "()" in Figure 2 in the present case, as in Figure 1.

Since the fourth fragment FR4 of the fifth service data unit SDU5 is smaller than the data field DAF of the sixth protocol data unit PDU6, a data segment - the shaded area as in Figure 1 - of the data field DAF is not needed for transmitting the fifth service data unit SDU5. In distinction from Figure 1, this

segment is filled essentially with service data of the sixth service data unit SDU6 by the transmitting telecommunication device (transmitter) of the DECT system if service data are still to be transmitted. The restriction to "essentially" must be made because the information field INF with the information items IN1...IN3 is again needed with the transmission of service data of the sixth service data unit SDU6 in the sixth protocol data unit PDU6.

The information field is required so that the receiving telecommunication device (receiver) can evaluate (detect) whether the service data contained in the free data segment of the data field DAF in the sixth protocol data unit PDU6 represent a fragment of the sixth service data unit SDU6 or, respectively, the non-end of the sixth service data unit SDU6 or the complete sixth service data unit SDUE or, respectively, the end of the sixth service data unit SDU6 and how large the service data length of the service data is in the free data segment of the data field DAF in the sixth protocol data unit PDU6.

The information field INF is preferably located following the fourth fragment FR4 of the fifth service data unit SDU5 and preceding the service data of the sixth service data unit SDU6 in the sixth protocol data unit PDU6.

Since the sixth service data unit SDU6 is larger than the free data segment of the data field DAF in the sixth protocol data unit PDU6, the sixth protocol data unit PDU6 is preferably



completely filled with a corresponding fifth fragment FR5 of the sixth service data unit SDU6. In the information field INF following the fourth fragment FR4 of the fifth service data unit SDU5 in the sixth protocol data unit PDU6, the first information item IN1 in the sixth protocol data unit PDU6 specifies the service data length of the fifth fragment FR5 of the sixth service data unit SDU6, whereas the third information item IN3 specifies that the service data contained in the data segment of the data field DAF represent the fifth fragment FR5 of the sixth service data unit SDU6 and that the non-end of the sixth service data unit SDU6 is present. The second information item IN2, which, in principle, is also possible as extension, is represented in "()" in Figure 2 in the present case, as in Figure 1.

Since the fifth fragment FR5 of the sixth service data unit SDU6 is preferably just as large as the (free) data segment of the data field DAF in the sixth protocol data unit PDU6, the data field DAF of the sixth protocol data unit PDU6 is completely utilized for the transmission of service data in the present case. The phenomenon described in conjunction with the transmission of the first service data unit SDU1 in Figure 1 will not, therefore, occur in the present case.

Seventh protocol data unit PDU7

The service data of the sixth service data unit SDU6, which did not fit into the sixth protocol data unit PDU6, are packed into the data field DAF of the seventh protocol data unit PDU7 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the service data length of the service data is in the data field DAF of the seventh protocol data unit PDU7 and whether the service data contained in the data field DAF represent a fragment of the sixth service data unit SDU6 or, respectively, the non-end of the sixth service data unit SDU6 or the complete sixth service data unit SDU6 or, respectively, the end of the sixth service data unit SDU6, the information field INF containing the information items IN1...IN3 is preferably provided following the header part ELT.

In the present case, the first information item IN1 specifies the service data length of the sixth fragment FR6 because a sixth fragment FR6 of the sixth service data unit SDU6 - which contains the service data of the sixth service data unit SDU6 which did not fit into the sixth protocol data unit PDU6 - is smaller than the data field DAF of the seventh protocol data unit PDU7, whereas the second information item IN2 specifies that the service data contained in the data field DAF now represent the complete sixth service data unit SDU6 and that the end of the sixth service data unit SDU6 is present. The third information

item IN3, which, in principle, is also possible as extension, is shown in "()" in Figure 2 in the present case, as in Figure 1.

The transmission session is ended at least 10 temporarily with the transmission of the service data units SDU4... SDU6.

5 This means, e.g. for the downlink, that the DECT base station, at the moment, has no further service data which it has to transmit to the DECT mobile part. In distinction from Figure 1, the DECT mobile part must be separately informed of this non-transmission state (default state). A special information item specifying this default state is therefore preferably transmitted in the seventh protocol data unit PDU7 at the conclusion of the transmission session within the framework of the information field. The special information item preferably consists of the second information item IN2 and a fourth information item IN4. 10 The fourth information item IN4 specifies that the service data length of the following service data unit has the length "0". This only means that no further service data are transmitted or, respectively, sent by the DECT base station to the DECT mobile part, at least temporarily. The above statements for the downlink 15 can also be transferred to the case where the transmission session takes place on the uplink. 20

## Patent claims

1. A method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, having the following features:

(a) the service data are transmitted in protocol data units (PDU5...PDU7) predefined by the radio interface protocol,

(b) at least one service data unit (SDU4...SDU6) configured at least as a fragment (FR3...FR6) is transmitted in each protocol data unit (PDU5...PDU7) independently of the size of the service data unit (SDU4...SDU6), which is configured at least as a fragment, in comparison with the size of the free part of the protocol data unit (PDU5...PDU7) which is in each case not yet occupied by service data,

(c) a service data length, which differs from the value "zero", of the respective service data unit (SDU4...SDU6) configured at least as a fragment (FR3...FR6) is in each case specified by a first information item (IN1) allocated to the protocol data unit (PDU5...PDU7),

(d) the end of the respective service data unit (SDU4...SDU6) is in each case specified by a second information item (IN2) allocated to the protocol data unit (PDU5...PDU7),

(e) the non-end of the respective service data unit (SDU4...SDU6) is in each case specified by a third information

item (1N3) allocated to the protocol data unit (PDU5...PDU7), a fourth information item (1N4) corresponding to 35 the value "zero" of the service data length is specified or, respectively, allocated to the protocol data unit (PDU5...PDU7), together with the second information item (1N2) in the protocol data unit (PDU5...PDU7) when the transmission of service data is ended at least temporarily, especially within this protocol data unit.

2. The method as claimed in claim 1, characterized in that the service data are transmitted protected.

3. The method as claimed in claim 1 or 2, characterized in that the first information item (1N1), the second information item (1N2) and the third information item (1N3) are arranged in front of the service data unit (SDU4...SDU6), which is at least configured as a fragment, in the respective protocol data unit (PDU5...PDU7).

4. The method as claimed in one of claims 1 to 3, characterized in that the second information item (1N2) consists of the value "0" of a bit and the third information item (1N3) consists of the value "1" of the bit.

## Abstract

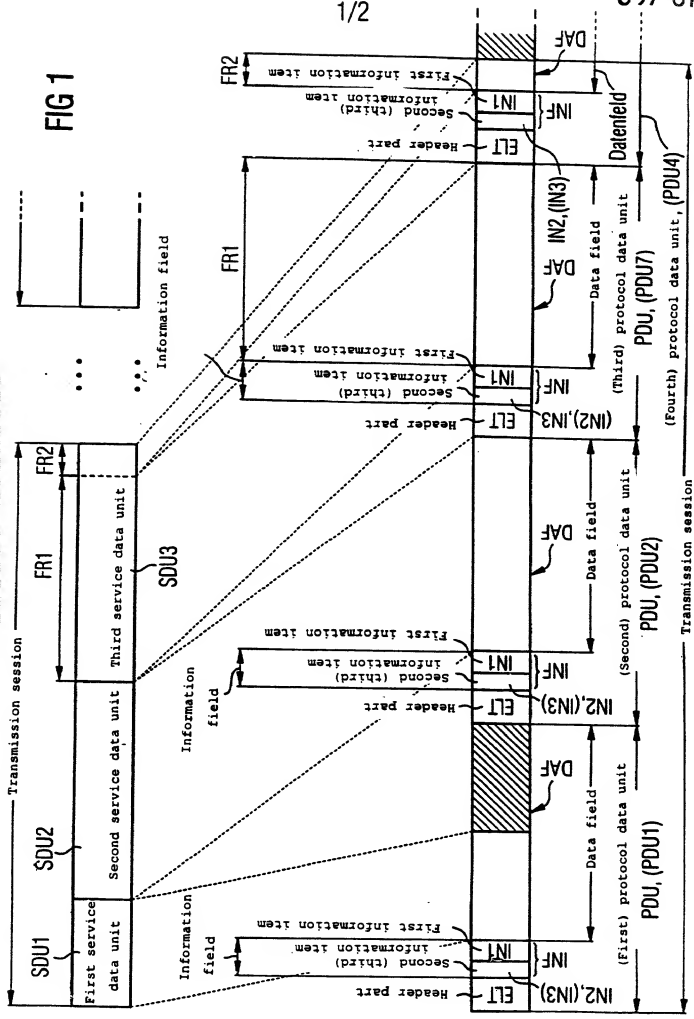
Method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems

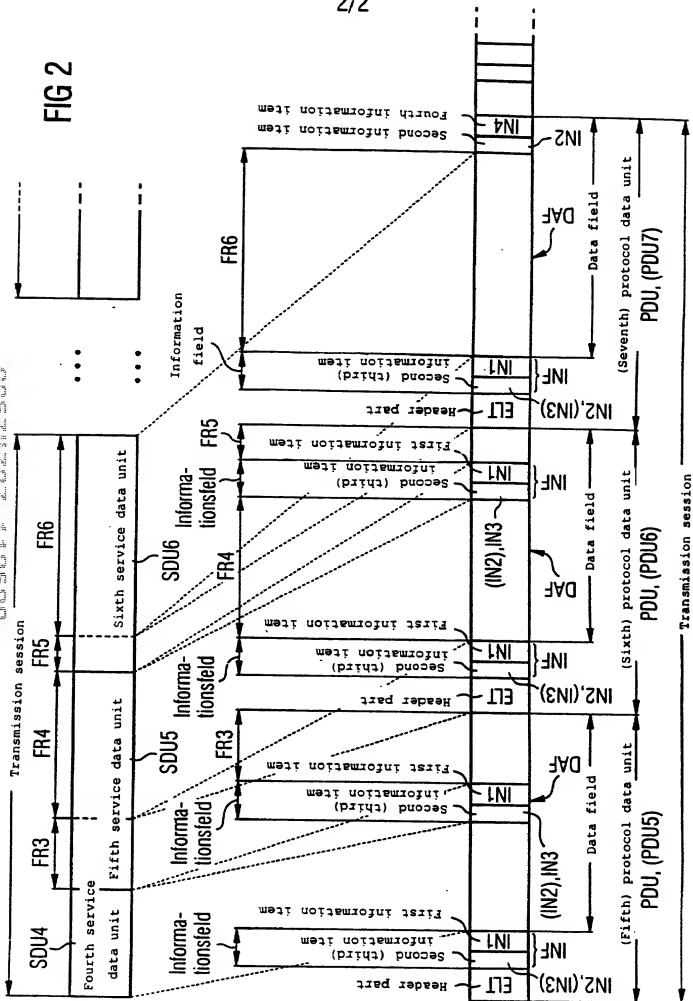
To transmit service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, with enhanced utilization of the band width of the telecommunication system and at a greater transmission rate, service data units to be transmitted are transported by radio cascaded (in the form of a cascade arrangement) in protocol data units adapted to the radio interface protocol. The protocol data units in each case contain as many information fields, configured especially as length indicators for specifying the respective service data length, as there are service data units or, respectively, fragments of service data units contained in the respective protocol data unit. In addition, each information field contains an extension (a reference) in the form of a concatenated list whether further service data units, or, respectively, further fragments of service data units follow in the respective protocol data unit.

FIGURE 2

00001 20212300

FIG 1



$$\frac{1}{\Gamma(\alpha)} \int_0^t (t-\tau)^{\alpha-1} f(\tau) d\tau = \frac{1}{\Gamma(\alpha)} \int_0^t (t-\tau)^{\alpha-1} f(\tau) d\tau$$




# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren zum Übertragen von Nutzdaten in Telekommunikationssystemen mit drahtloser auf einem vorgegebenen Luftschnittstellenprotokoll basierender Telekommunikation zwischen Telekommunikationsgeräten, insbesondere Sprach- und/oder Paketdaten in DECT-Systemen

deren Beschreibung

(zutreffendes ankreuzen)

☒ hier beigelegt ist.

☐ am \_\_\_\_\_ als

PCT internationale Anmeldung

PCT Anmeldungsnummer \_\_\_\_\_

eingereicht wurde und am \_\_\_\_\_

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

\_\_\_\_\_  
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\_\_\_\_\_

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on \_\_\_\_\_ as

PCT international application

PCT Application No. \_\_\_\_\_

and was amended on \_\_\_\_\_

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

## German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

198 20 233.4 Germany 06. Mai 1998  
(Number) (Country) (Day Month Year Filed)  
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☒ ☐  
Yes No  
Ja Nein

\_\_\_\_\_  
(Number) (Country) (Day Month Year Filed)  
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

\_\_\_\_\_  
(Number) (Country) (Day Month Year Filed)  
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

\_\_\_\_\_  
(Application Serial No.)  
(Anmeldeserienummer)

\_\_\_\_\_  
(Filing Date)  
(Anmeldedatum)

\_\_\_\_\_  
(Status)  
(patentiert, anhängig,  
aufgegeben)

\_\_\_\_\_  
(Status)  
(patented, pending,  
abandoned)

\_\_\_\_\_  
(Application Serial No.)  
(Anmeldeserienummer)

\_\_\_\_\_  
(Filing Date)  
(Anmeldedatum)

\_\_\_\_\_  
(Status)  
(patentiert, anhängig,  
aufgeben)

\_\_\_\_\_  
(Status)  
(patented, pending,  
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

# German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

And I hereby appoint

Messrs. John D. Simpson (Registration No. 19,842), Lewis T. Steadman (17,024), William C. Stueber (18,453), P. Phillips Connor (19,259), Dennis A. Gross (24,440), Marvin Moody (18,548), Steven H. Noll (28,962), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W. Guyon (29,827), Edward A. Lehmann (22,312), James D. Hubert (24,159), Robert M. Barlett (30,142), James Van Santen (18,584), J. Arthur Gross (13,615), Richard J. Schwarz (19,422) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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Postanschrift <b>Münsterstr. 135 D-48477 Hörstel Bundesrepublik Deutschland</b>		Post Office Address	
Voller Name des zweiten Miterfinders (falls zutreffend): <b>KRUK, Anton</b>		Full name of second joint inventor, if any:	
Unterschrift des Erfinders <i>Anton Kruk</i>	Datum <b>21.05.99</b>	Second inventor's signature	Date
Wohnsitz <b>D-40699 Erkrath, Germany DEX</b>		Residence	
Staatsangehörigkeit <b>Bundesrepublik Deutschland</b>		Citizenship	
Postanschrift <b>Schubertstr. 20 D-40699 Erkrath Bundesrepublik Deutschland</b>		Post Office Address	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).